

FROM SHEEP TO HEART: A CASE OF INFECTIVE ENDOCARDITIS DUE TO COXIELLA BURNETII

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Rezumat

Lucrarea de față prezintă cazul unui pacient în vârstă de 58 ani, de profesie cioban, diagnosticat cu endocardită infecțioasă cauzată de Coxiella burnetii. Pacientul s-a prezentat cu simptome de dispnee, oboseală, edeme al membrelor inferioare și oligurie. Examinarea clinică a evidențiat modificări la nivelul aparatului cardiovascular iar investigațiile paraclinice au indicat prezența unui sindrom inflamator și afectare renală acută. Hemoculturile au fost negative, dar testele serologice au confirmat prezența Coxiella burnetii, și corelat cu modificările ecocardiografice, a fost stabilit diagnosticul de endocardită infecțioasă de valvă aortică. Pacientul a fost tratat pentru insuficiența cardiacă și renală dar a primit și terapie antibiotică ținută cu Doxiciclină, ceea ce a dus la un răspuns clinic favorabil și la ameliorarea simptomelor. Acest caz subliniază importanța recunoașterii infecțiilor zoonotice la persoanele cu expunere ocupațională și evidențiază necesitatea unor abordări diagnostice cuprinzătoare în prezentările atipice ale endocarditei infectioase.

Cuvinte cheie: Coxiella burnetii, endocardită infecțioasă, serologie, expunere ocupațională.



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Abstract

*This article presents a case of infective endocarditis caused by *Coxiella burnetii* in a 58-year-old male shepherd from a rural background. The patient was admitted with symptoms of dyspnea, fatigue, lower limb edema, and oliguria. Clinical examination revealed significant cardiac and systemic findings, while paraclinical investigations indicated inflammatory status and renal impairment. Blood cultures were negative, while serological testing revealed and confirmed the presence of *Coxiella burnetii*. The diagnosis of infective endocarditis affecting the aortic valve was established. The patient received treatment for cardiac failure and targeted antibiotic therapy with Doxycycline, resulting in a favorable clinical response and resolution of symptoms. This case emphasizes the importance of recognizing zoonotic infections in individuals with occupational exposure and highlights the need for comprehensive diagnostic approaches in atypical presentations of endocarditis.*

Key words: *Coxiella burnetii, Infective endocarditis, Serology, Occupational exposure.*

Introduction

Coxiella burnetii, a highly infectious rickettsial organism, is best known as the causative agent of Q fever, a zoonotic disease primarily transmitted from animals, particularly sheep, goats, and cattle, to humans who came in contact with⁽¹⁾. While Q fever commonly manifests as a self-limiting febrile illness, it can also lead to severe complications, including infective endocarditis, which is rare but potentially life-threatening condition⁽²⁾. Infective endocarditis due to *Coxiella burnetii* presents unique challenges in both diagnosis and management. The insidious nature of the

infection often results in delayed recognition, as clinical symptoms may mimic those of other forms of endocarditis or present nonspecifically⁽³⁾. Furthermore, standard blood cultures may fail to identify this organism, necessitating serological testing or polymerase chain reaction (PCR) for accurate diagnosis⁽⁴⁾.

This case presentation aims to explore the complexities of *Coxiella burnetii* infective endocarditis through a detailed clinical case, emphasizing the importance of awareness among clinicians, the role of diagnostic modalities, and the implications for treatment. By bringing attention to this often-

underdiagnosed condition, we aim to enhance understanding and improve clinical outcomes for affected patients.

Clinical case presentation

We present the case of P.G., a 58-year-old male from a rural background, who was admitted to the Clinical County Emergency Clinical Hospital from Suceava in May 2023, presenting with significant dyspnea, persistent fatigue, lower limb edema, and oliguria. The initial clinical examination revealed rhythmic heart sounds with early diastolic and midsystolic murmurs. Notably, the patient was afebrile, exhibiting pallor of the skin and sclera. He also presented digital clubbing, indicative of chronic hypoxia or other underlying pathology. Additionally, splenomegaly and pronounced lower limb edema were observed.

The electrocardiogram (ECG) performed in the Emergency Department showed negative T waves in leads V2-V6, DI, aVL, while echocardiography revealed critical cardiac findings. The echocardiogram confirmed a bicuspid aortic valve and multiple hyper-echoic masses were visualized attached to this valve, two of the biggest measuring 8 x 0.4 mm and 11 x 0.5 mm (Figure 1 a and b). This examination also revealed moderate aortic stenosis (Figure 1c), severe aortic regurgitation (Figure 1d) and tricuspid regurgitation, moderate mitral regurgitation, and a patent foramen ovale with a left-to-right shunt, and mildly reduced ejection fraction.

Blood cultures were taken right after the admission within the Cardiology Department. Routine laboratory results indicated a severe inflammatory response, marked by elevated inflammatory markers, significant renal retention of nitrogenous waste, and evidence

of anemia as Shown in Table 1. The urinalysis was abnormal, and complement component C3 levels were slightly reduced. Paraclinical examinations were completed with an abdominal ultrasound, which indicated normal aspect of the kidneys and splenomegaly.

Given the clinical context and findings, after blood cultures were collected, empirical antibiotic therapy was initiated with Ampicillin and Vancomycin, and hemodialysis was initiated in conjunction with acute heart failure treatment. Throughout the hospitalization, P.G.'s clinical status remained stable with improvement of the symptoms, resolution of lower limbs edema and amelioration of the kidney function; however, inflammatory markers exhibited a concerning upward trend over the following days. These findings necessitated close monitoring and further diagnostic efforts. Other blood cultures were taken again and antibiotic treatment was adjusted to Tazocin, Vancomycin, and Fluconazole.

Since repeated blood cultures were negative, the Phase I and phase II, IgM and IgG *Coxiella burnetii* titers were determined. After integration of the clinical and laboratory data, along with positive serological tests for *Coxiella burnetii* (Table 2) the diagnosis of infective endocarditis affecting the aortic valve was established.

The antibiotic regimen was continued with Doxycycline to specifically target the identified pathogen. The inflammatory syndrome showed signs of regression, indicating a positive response to treatment, with complete resolution after 1 month of treatment, but similar echocardiographic aspect of the aortic valve.

After stabilization, taking into consideration the aspect of the aortic valve and the



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associated heart failure with mid-range ejection fraction, the patient was referred to a cardiothoracic surgery department for aortic valve replacement, but the patient refused open-heart surgery even after psychological counseling.

Discussion

This case of *Coxiella burnetii* infective endocarditis highlights several critical aspects of diagnosis and management associated with this uncommon but serious condition. Endocarditis caused by *Coxiella burnetii* is notably rare compared to other pathogens, yet it poses significant risks, especially in individuals with relevant occupational exposures⁽⁵⁾, such as P.G., who worked as shepherd.

Coxiella burnetii typically presents with a range of symptoms, often overlapping with more common forms of endocarditis. As noted in P.G.'s case, symptoms such as dyspnea, fatigue, and edema can be misleading, as they may mimic other cardiac or respiratory conditions. The presence of digital clubbing and splenomegaly can also be indicative of chronic infectious processes, aligning with findings reported by who emphasized that these clinical signs, though non-specific, should raise suspicion for endocarditis⁽⁶⁾.

The initial diagnostic challenge is compounded by the limitations of traditional blood cultures,

which are negative and frequently fail to detect *Coxiella burnetii*. This necessitates reliance on serological tests to confirm the diagnosis, as highlighted in the literature⁽⁷⁾. In our case, the positive serology for *Coxiella burnetii* was pivotal in establishing the diagnosis after other potential causes of the patient's symptoms were ruled out.

Echocardiography is a critical tool in evaluating patients with suspected endocarditis⁽⁸⁾. P.G.'s echocardiographic findings of a hyper-echoic mass on the aortic valve, alongside significant valvular insufficiencies, are consistent with literature reporting similar echocardiographic features in cases of *Coxiella burnetii* endocarditis⁽⁹⁾. The complexity of valvular dysfunction observed in this patient underscores the need for comprehensive cardiac evaluation in cases of suspected endocarditis.

Coxiella burnetii infection is not typically associated with direct kidney involvement. Kidney damage related to Q fever usually occurs in cases of chronic infection or endocarditis, where immune complex deposition develops^(10,11). In our case hemofiltration partially restored the kidney function.

Empirical antibiotic therapy is crucial in managing endocarditis while awaiting specific diagnosis. In P.G.'s case, the initial regimen of Ampicillin and Vancomycin was appropriate for broader coverage against common

Parameter	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Normal range
Leucocytes mii/uL	6,76				8.33											
Erythrocytes mil/uL	3.03				2.7											
Platelets mii/ul	282				295											
Hemoglobin g/dl	9				8.7											
Ht %	27.1				25.7											
Fe ug/dL																
NTproBNP ng/ml	35.5 93															
D-dimer ng/ml	14.15															
LDL-C mg/dl	115															
HDL-C mg/dl	17															
TG mg/dl	172															
Clor mmol/L	105		103			102	99	97	92	88						
K mmol/L	5.8		4.7			3	3	2.8	2.8	3.4						
Na mmol/L	134		134			137	134	133	125	121						
Creatinine mg/dL	9.83	10.6	6.36		5.9	3.57	4.3	3.71	3.04	2.88						
Urea mg/dL		102	55		69	79	351	353	316	293						
TGP U/L	5															
TGO U/L	8															
Glycemie mg/dl	98															
CRP mg/dl	15.01		5.81		1.92											
Fibrinogen mg/dL	524															
Erythrocyte sedimentation rate mm/h	56															
ASLO UI/mL		187.2														
C3c mg/dl		69														
C4 mg/dl		31.3														
Rheumatoid factor UI/mL		42.5														
HCV				Negative												
Ag HBs				Negative												
Hemocultures																

Table1. Biochemical parameters of the patient



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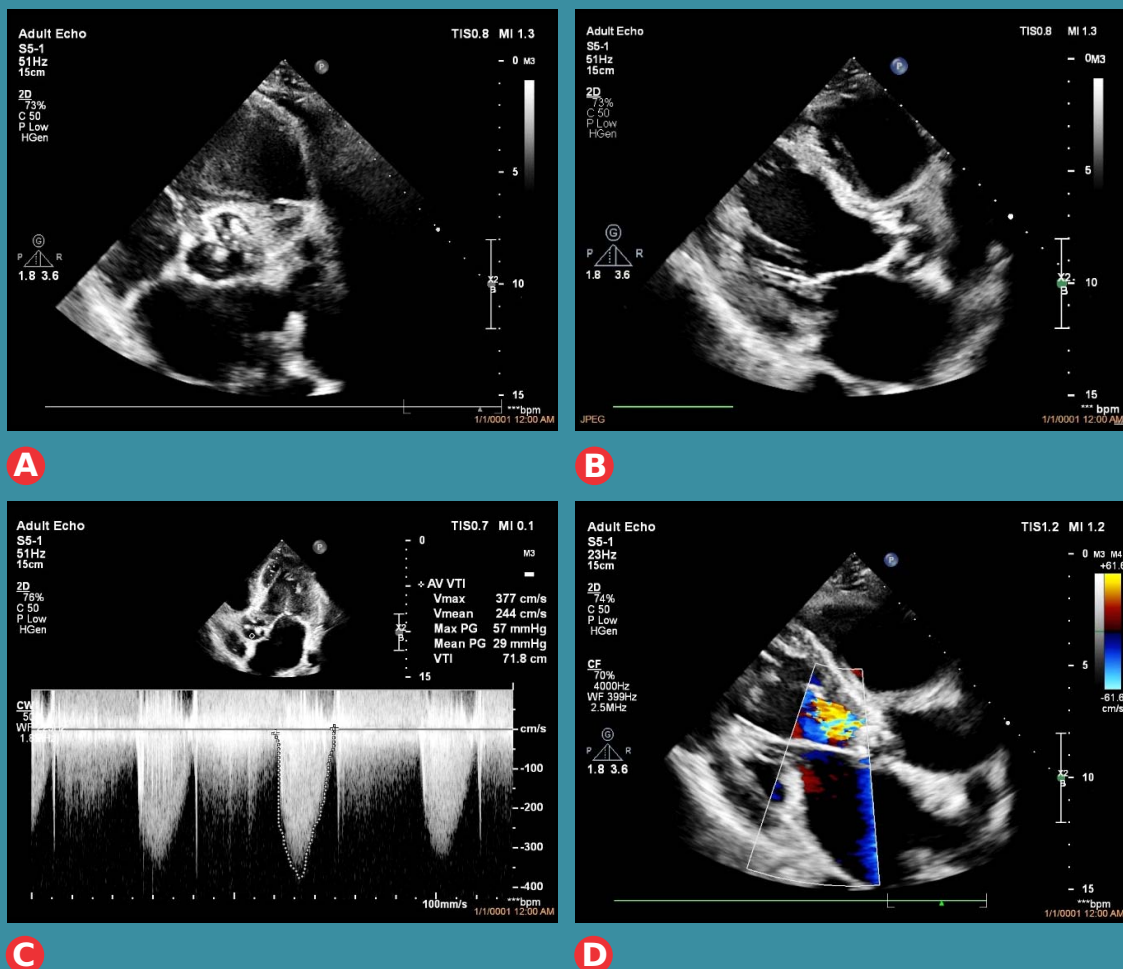


Figure 1. Echocardiographic findings: a) bicuspid aortic valve and multiple hyper-echoic masses, b) two of hyper-echoic masses measuring 8 x 0.4 mm and 11 x 0.5 mm, c) moderate aortic stenosis, d) severe aortic regurgitation in Color Doppler.

	Results	Reference interval
Coxiella burnetii IgG phase I	1:64	<1/16
Coxiella burnetii IgM phase I	< 1:16	<1/16
Coxiella burnetii IgG phase II	1:256	<1/16
Coxiella burnetii IgM phase II	< 1:16	<1/16

Table 2. Serological tests for *Coxiella burnetii*

pathogens. However, as *Coxiella burnetii* is resistant to many conventional antibiotics, the subsequent switch to Doxycycline was essential for effective treatment⁽¹²⁾. The recommended duration of therapy for *Coxiella burnetii* endocarditis is typically at least 18 months, emphasizing the need for careful monitoring of clinical and laboratory parameters to ensure resolution of the infection⁽¹³⁾.

P.G.'s favorable clinical response and regression of inflammatory markers align with findings in the literature indicating that early identification and appropriate antibiotic therapy can lead to positive outcomes in patients with *Coxiella burnetii* endocarditis^(14,15). Continuous follow-up is necessary to monitor for potential late complications, as well as to reassess cardiac function and overall health. In this case psychological impact of a potential open-heart surgery was significant. The patient faced anxiety and psychological counseling didn't help him overcome it. Preoperative psychological preparation is becoming increasingly important in cardiac surgery, yet patients' psychological well-being often does not receive the attention it warrants. There is evidence suggesting that such preparation can lead to better

postoperative outcomes. However, since the overall evidence remains limited, more research is needed to identify which interventions are most effective for different patients and the reasons behind their success⁽¹⁶⁾.

Conclusion

This case serves as a reminder of the importance of considering *Coxiella burnetii* in the differential diagnosis of infective endocarditis, especially in patients with negative blood cultures and relevant occupational histories. Increased awareness and understanding of this pathogen can facilitate timely diagnosis and effective management, ultimately improving patient outcomes. Future studies and clinical guidelines should continue to address the particularities of diagnosis and treatment related to this rare but serious infection.

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